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EXAMINER	
FLANAGAN, KRISTA M	
ART UNIT	PAPER NUMBER
2631	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/761,754	JUN, JUNG SIG	
	Examiner	Art Unit	
	Krista M. Flanagan	2631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 January 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *18 January 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference characters "108" and "109" have both been used to designate the digital processor.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "201" has been used to designate both the complex multiplier in figure 2 and the resampler in figure 3. Also, reference character 202 has been used to designate both the low-pass filter in figure 2 and the fixed oscillator in figure 3.

3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: figure 2, reference character 200 and figure 6, reference characters 601-607.

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show figure 2, the symbol clock recovery mentioned on page 4, [0014] and figure 3, the digital processor mentioned on page 12, [0047] as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

5. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either

"Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

6. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

7. The abstract of the disclosure is objected to because line one states "Disclosed is a digital TV receiver ..." Please omit "Disclosed is". Correction is required. See MPEP § 608.01(b).

8. The disclosure is objected to because of the following informalities: Please define OQAM, A/D converter, and NCO where first mentioned in the specification as you have done with VSB (Vestigial Side Band) for example. Please put a space between any numbers and their units (e.g. 2.690559MHz -> 2.690559 MHz) throughout the specification, including the claims. It is the examiner's opinion that [0007] could be omitted. If not, please correct the description of figure 2 in that paragraph to reflect the correct reference characters. Paragraphs [0011], [0014-0015], [0020], [0042-0044], and [0047] need to be changed to reflect the correct reference characters for the pertinent figures as well. Page 12, paragraph [0050] please correct the figure range. It is the examiner's opinion that the paragraph should state "Figs. 4A to 4D" not "Figs. 4A to 5D". Page 14, paragraph [0055], line 8, please correct the spelling of squarers and line 13,

it is the examiner's opinion that the word "to" has been omitted: "The present invention may be applied all ATSC types..." -> "The present invention may be applied **to** all ATSC types..."

Appropriate correction is required.

Claim Objections

9. Claims 6, 8, 11, 13 and 14 are objected to because of the following informalities: Connecting terms are missing between the subjects and actions (e.g. a high pass filter performing -> a high pass filter **for** performing, etc.).

10. It is suggested that "digital" be added to claim 2, line 2 "[analog] passband signal into a passband signal..." -> "[analog] passband signal into a **digital** passband signal..."

11. It is suggested that "the" be omitted from claim 3, line 2 "higher than **the** at least two times..." -> "higher than at least two times..."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 2 and 3 recite the limitation "the fixed oscillator" in line 3 and 2, respectively. There is insufficient antecedent basis for this limitation in the claim.

14. Claim 4 recites the limitation "the digital passband signal" in line 3 and 2, respectively. There is insufficient antecedent basis for this limitation in the claim.

15. Claims 6, 8, 11, and 14 recite the limitation "the first resampler" in last lines. There is insufficient antecedent basis for this limitation in the claim. Should claim 8 depend from claim

5, which is dependent upon claim 1, where the resampler is mentioned for the first time? It is suggested that the word 'first' be omitted in all claims in regards to the resampler.

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 1-5, 10 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Scarpa et al. U.S. Patent No. 5,673,293.

18. Regarding claim 1, Scarpa discloses a digital TV receiver, comprising: an A/D converter for converting an analog signal into a digital signal (See figure 1, block 114 and column 3, lines 27-30); a carrier recovery for converting the digital pass-band signal into a digital base-band signal (See figure 1, blocks 120 and 135 and column 7, lines 9-17); and a symbol clock recovery for converting digital real/imaginary base-band component signal into QAM type of real/imaginary component signals (See figure 1, block 147 and column 8, lines 50-59), detecting timing error information by performing the high pass-band filtering on the QAM real/imaginary signals, and squaring and adding the filtered value (where it is known that symbol timing recovery can be done by squaring and adding the filtered I and Q channels to produce tone at symbol frequency, see column 5, lines 36-45), and for generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information (See figure 1, block 147 and column 5, lines 14-19). Where OQAM is simply "staggered QAM" and all results would still hold.

19. Regarding claim 2, which inherits all of the limitations of claim 1, Scarpa discloses a digital TV receiver, wherein the A/D converter converts the analog passband signal into a passband signal by sampling the analog signal at a fixed frequency generated from the fixed oscillator or at least two times the frequency of the symbol clock (See column 8, lines 37-49).

20. Regarding claim 3, which inherits all of the limitations of claim 2, Scarpa discloses a digital TV receiver, wherein the fixed frequency generated from the fixed oscillator is higher than the at least two times the frequency of the symbol clock (See column 8, lines 37-49).

21. Regarding claim 4, which inherits all of the limitations of claim 1, Scarpa discloses a digital TV receiver, wherein the carrier recovery multiplies the digital passband signal by a standard carrier signal through the carrier recovery process for converting the signal into the digital baseband signal (See figure 1, block 130 and column 7 line 9- column 8 line 4).

22. Regarding claim 5, which inherits all of the limitations of claim 1, Scarpa discloses a digital TV receiver which further comprises a resampler for resampling the digital real/imaginary baseband signals to at least two times the frequency of the symbol clock frequency, and interpolating each of the signals (See column 5, line 64 - column 6, line 55).

23. Regarding claim 10, Scarpa discloses a digital TV receiver, comprising: an A/D converter for taking a sample of a fixed frequency from a VSB type of analog passband signal for converting the signal into a digital passband signal (See figure 1, block 114 and column 3, lines 27-30); a carrier recovery for multiplying the VSB digital passband signal by a standard carrier signal generated from the carrier recovery process for converting the signal into a VSB digital baseband signal (See figure 1, blocks 120 and 135 and column 7, lines 9-17); a resampler for taking a sample of at least two times the frequency of the symbol clock from the VSB digital

baseband real/imaginary signals generated from the carrier recovery so as to interpolate the signals (See column 5, line 64 - column 6, line 55); and a symbol clock recovery for converting the VSB digital real/imaginary baseband component signals into QAM type of real/imaginary component signals (See figure 1, block 147 and column 8, lines 50-59), detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals (where it is known that symbol timing recovery can be done by squaring and adding the filtered I and Q channels to produce tone at symbol frequency, see column 5, lines 36-45), and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information (See figure 1, block 147 and column 5, lines 14-19). Where OQAM is simply "staggered QAM" and all results would still hold.

24. Regarding claim 13, Scarpa discloses a digital TV receiver, comprising: an A/D converter for taking a sample of at least two times the frequency of the symbol clock from a VSB analog passband signal for converting the signal into a digital passband signal (See figure 1, block 114 and column 3, lines 27-30); a carrier recovery for multiplying the VSB digital passband signal by a standard carrier signal generated from the carrier recovery process for converting the signal into a VSB digital baseband signal (See figure 1, blocks 120 and 135 and column 7, lines 9-17); a resampler for taking a sample of at least two times the frequency of the symbol clock from the VSB digital baseband real/imaginary signals generated from the carrier recovery and interpolating the signals (See column 5, line 64 - column 6, line 55); and a symbol clock recovery for converting the VSB digital baseband real/imaginary component signals into QAM type of real/imaginary component signals (See figure 1, block 147 and column 8, lines 50-59), detecting timing error information by high-passband-filtering, squaring, and adding the QAM

real/imaginary signals (where it is known that symbol timing recovery can be done by squaring and adding the filtered I and Q channels to produce tone at symbol frequency, see column 5, lines 36-45), and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information (See figure 1, block 147 and column 5, lines 14-19). Where OQAM is simply "staggered QAM" and all results would still hold.

Double Patenting

25. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

26. Claims 1, 2, 4-9, 11, 12, 14 and 15 are provisionally rejected under the judicially created doctrine of double patenting over claims 1-7, 8, 9, 11, 14, 16, and 19 respectively of copending Application No. 10/773,041 ('041). This is a provisional double patenting rejection since the conflicting claims have not yet been patented.

27. The subject matter claimed in the instant application is fully disclosed in the referenced copending application and would be covered by any patent granted on that copending application since the referenced copending application and the instant application are claiming common subject matter, as follows:

a. Regarding claim 1, the same digital television receiver is claimed in both applications (claim 1 of the '041 patent application).

b. Regarding claim 2, the current application fails to use the phrase transmitted in a VSB modulation type but per ATSC standard all US digital television broadcasts will be transmitted in a VSB modulation type (claim 2 of the '041 patent application).

c. Regarding claim 4, the same matter is claimed in both applications (claim 3 of the '041 patent application).

d. Regarding claim 5, the same matter is claimed in both applications (claim 4 of the '041 patent application).

e. Regarding claim 6, the same matter is claimed in both applications (claim 5 of the '041 patent application).

f. Regarding claim 7, the same matter is claimed in both applications (claim 6 of the '041 patent application).

g. Regarding claim 8, the '041 refers to a first and second squaring operator and an adder while the current application, claim 8, refers to a squarer where the squarer is the first and second squaring operators and the adder.

h. Regarding claim 9, the same matter is claimed in both applications (claim 9 of the '041 patent application).

i. Regarding claim 11, which inherits all of the limitations of claim 10, the same matter is claimed in both applications (claim 11 of the '041 patent application).

j. Regarding claim 12, the same matter is claimed in both applications (claim 14 of the '041 patent application).

k. Regarding claim 14, which inherits all of the limitations of claim 13, the same matter is claimed in both applications (claim 16 of the '041 patent application).

l. Regarding claim 15, the same matter is claimed in both applications (claim 19 of the '041 patent application).

Furthermore, there is no apparent reason why applicant would be prevented from presenting claims corresponding to those of the instant application in the other copending application. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

The chart below summarizes the double patenting issues.

Claim	Current Application	'041 Application	Claim
1	A digital TV receiver, comprising: an A/D converter for converting an analog signal into a digital signal; a carrier recovery for converting the digital passband signal into a digital baseband signal; and a symbol clock recovery for converting digital real/imaginary baseband component signals into OQAM type of real/imaginary component signals, detecting timing error information by **high-passband-filtering, squaring, and adding the OQAM real/imaginary signals**, and for	A digital TV receiver, comprising: an A/D converter for converting an analog signal into a digital signal; a carrier recovery for converting the digital pass-band signal into a digital base-band signal; and a symbol clock recovery for converting digital real/imaginary base-band component signal into OQAM type of real/imaginary component signals, detecting timing error information by **performing the high pass-band filtering on the OQAM real/imaginary signals,**	1

	generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information.	**and squaring and adding the filtered value**, and for generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information. **No change in function or parts.**	
2	The digital TV receiver of claim 1, wherein the A/D converter converts the analog passband signal into a passband signal by sampling the analog signal at a fixed frequency generated from the fixed oscillator or at least two times the frequency of the symbol clock.	The digital TV receiver of claim 1, wherein the A/D converter converts the analog pass-band signal **transmitted in a VSB modulation type** into a pass-band signal by sampling the analog signal at a fixed frequency generated from the fixed oscillator or at least two times the frequency of the symbol clock. **A VSB modulation type, per ATSC standard, is in use for all digital television broadcasts.**	**2**
4	The digital TV receiver of claim 1, wherein the carrier recovery multiplies the digital passband signal by a standard carrier signal through the carrier recovery process for converting the signal into the	The digital TV receiver of claim 1, wherein the carrier recovery multiplies the digital pass-band signal by a standard carrier signal **generated** through the carrier recovery process for converting	**3**

	digital baseband signal.	the signal into the digital base-band signal. **No change in function or parts.**	
5	The digital TV receiver of claim 1 further comprises a resampler for resampling the digital real/imaginary baseband signals to at least two times the frequency of the symbol clock frequency, and interpolating each of the signals.	The digital TV receiver of claim 1 further comprises a resampler for resampling the digital real/imaginary base-band signals to at least two times the frequency of the symbol clock frequency, and interpolating each of the signals. **No change in function or parts.**	**4**
6	The digital TV receiver of claim 5, wherein the symbol clock recovery comprises: an OQAM converter for converting each of the digital baseband real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals; a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section; a squarer for squaring each of the OQAM	The digital TV receiver of claim 5, wherein the symbol clock recovery comprises: an OQAM converter converting each of the digital base-band real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals; a high pass filter performing a high pass-band filtering on the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section, a squarer squaring each of the OQAM	**5**

	real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation; a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the squarer; a timing error detector for detecting timing error information from the output of the pre-filter; a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and an NCO for generating at least two times the frequency of the symbol clock **recovered** according to low passband signals of the filtered timing error information and outputting to the first resampler.	real/imaginary component signals filtered by and outputted from the high pass-band filter, and adding and outputting the calculation; a pre-filter passing only a frequency of a predetermined band from the output of the squarer for recovering the symbol clock; a timing error detector detecting timing error information from the output of the pre-filter; a filtering member filtering only a low pass-band signal from the timing error information outputted from the timing error detector; and an NCO generating at least two times the frequency of the symbol clock **interpolated** according to low pass-band components of the filtered timing error information and outputting to the first resampler. **Interpolated and recovered are synonymous here. No change in function or parts.**	
7	The digital TV receiver of claim 6,	The digital TV receiver of claim 6,	**6**

	wherein the OQAM converter multiplies digital baseband real/imaginary component signals interpolated and outputted from the resampler by a fixed frequency with a center frequency of 2.690559 MHz for converting digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.	wherein the OQAM converter multiplies digital base-band real/imaginary component signals interpolated and outputted from the resampler by a fixed frequency with a center frequency of 2.690559 MHz for converting digital base-band real/imaginary component signals into the OQAM real/imaginary component signals. **No change in function or parts.**	
8	The digital TV receiver of claim 1, wherein the symbol clock recovery comprises: an OQAM converter for converting each of the digital baseband real/imaginary signals outputted from the carrier recovery into OQAM real/imaginary component signals; a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section; **a squarer for**	The digital TV receiver of claim 1, wherein the symbol clock recovery comprises: an OQAM converter converting each of the digital base-band real/imaginary signals outputted from the carrier recovery into OQAM real/imaginary component signals; a high pass filter performing a high pass-band filtering on the UQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section; **a first**	**8**

	squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation; a pre-filter for passing only a frequency of a **particular band** to recover the symbol clock from the output of the **squarer**; a timing error detector for detecting timing error information from the output of the pre-filter; a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and an NCO for generating at least two times the frequency of the symbol clock recovered according to low passband signals of the filtered timing error information and outputting to the first resampler.	**squaring operator squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high pass filter, and calculating difference of the two squared signals and squaring the calculation; a second squaring operator squaring each of the OQAM real/imaginary component signals filtered by -an outputted from the high pass filter, and calculating and squaring a difference of the two squared signals; an adder adding the output of the first and second squaring operators;** a pre-filter passing only a frequency of a **predetermined band** for recovering the symbol clock from the output of the **adder**; a timing error detector detecting timing error information from the output of the pre-filter; a filtering member filtering only the low pass-band signal from the timing error information outputted from the	

		timing error detector; and an NCO for generating at least two times the frequency of the symbol clock recovered according to low pass-band signals of the filtered timing error information and outputting to the first resampler. **Where the squarer in the current application is the first and second squaring operators and the adder in the '041 application. The output of the squarer is the output of the adder because the adder is the last step in the squaring operator. No change in function or parts.**	
9	The digital TV receiver of claim 8, wherein the OQAM converter multiplies the VSB digital baseband real/imaginary component signals outputted from the carrier recovery by the fixed frequency with a center frequency of 2.690559 MHz for converting the VSB digital baseband real/imaginary component signals into the	The digital TV receiver of claim 8, wherein the OQAM converter multiplies the VSB digital base-band real/imaginary component signals outputted from the carrier recovery by the fixed frequency with a center frequency of 2.690559 MHz for converting the VSB digital base-band	9

	OQAM real/imaginary component signals.	real/imaginary component signals into the OQAM real/imaginary component signals. **No change in function or parts.**	
11	10. A digital TV receiver, comprising: an A/D converter for taking a sample of a fixed frequency from a VSB type of analog passband signal for converting the signal into a digital passband signal; a carrier recovery for multiplying the VSB digital passband signal by a standard carrier signal generated from the carrier recovery process for converting the signal into a VSB digital baseband signal; a resampler for taking a sample of at least two times the frequency of the symbol clock from the VSB digital baseband real/imaginary signals generated from the carrier recovery so as to interpolate the signals; **and a symbol clock recovery for converting the VSB digital real/imaginary baseband component signals into OQAM type of**	A digital TV receiver, comprising: an A/D converter converting an analog signal into a digital signal; a carrier recovery converting the digital pass-band signal into a digital base-band signal; a resampler resampling digital base-band real/imaginary component signals outputted from the carrier recovery to at least two times the frequency of the symbol clock and interpolating each of the signals; **an OQAM converter converting each of the digital base-band real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals; a high pass filter performing a high pass-band filtering on the OQAM real/imaginary component signals outputted from the**	**11**

	real/imaginary component signals, detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals, and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information wherein the symbol clock recovery comprises: an OQAM converter for converting each of the digital baseband real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component signals; a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section; a squarer for squaring each of the OQAM real/imaginary component signals filtered by and outputted from	**OQAM converter for removing information of data section; a squarer squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high pass-band filter, and adding and outputting the calculation; a pre-filter passing only a frequency of a predetermined band from the output of the squarer for recovering the symbol clock; a timing error detector detecting timing error information from the output of the pre-filter; a filtering member filtering only a low pass-band signal from the timing error information outputted from the timing error detector; and an NCO generating at least two times the frequency of the symbol clock interpolated according to low pass-band components of the filtered timing error information and outputting to**	

	the high passband filter, and adding and outputting the calculation; a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the squarer; a timing error detector for detecting timing error information from the output of the pre-filter; a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and an NCO for generating at least two times the frequency of the symbol clock recovered according to low passband signals of the filtered timing error information and outputting to the first resampler.	**the first resampler.** **No change in functions or parts.**	
12	The digital TV receiver of claim 11, wherein the OQAM converter multiplies digital baseband real/imaginary component signals interpolated and	The digital TV receiver of claim 11, wherein the OQAM converter multiplies digital base-band real/imaginary component signals interpolated and	**14**

	outputted from the resampler by a fixed frequency with a center frequency of 2.690559M1-1z for converting digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.	outputted from the resampler by a fixed frequency with a center frequency of 2.690559 MHz for converting digital base-band real/imaginary component signals into the OQAM real/imaginary component signals. **No change in function or parts.**	
14	A digital TV receiver, comprising: an A/D converter taking a sample of at least two times the frequency of the symbol clock from g VSB analog passband signal for converting the signal into a digital passband signal; a carrier recovery multiplying the VSB digital passband signal by a standard carrier signal generated from the carrier recovery process for converting the signal into a VSB digital baseband signal; a resampler taking a sample of at least two times the frequency of the symbol clock from the VSB digital baseband real/imaginary signals generated from the carrier	A digital TV receiver, comprising: an A/D converter converting an analog signal into a digital signal; a carrier recovery converting the digital pass-band signal into a digital base-band signal; a resampler resampling digital base-band real/imaginary component signals outputted from the carrier recovery to at least two times the frequency of the symbol clock and interpolating each of the signals; an OQAM converter converting each of the digital base-band real/imaginary signals interpolated and outputted from the resampler into OQAM real/imaginary component	**16**

	recovery and interpolating the signals; and a symbol clock recovery for converting the VSB digital baseband real/imaginary component signals into OQAM type of real/imaginary component signals, detecting timing error information by high-passband-filtering, squaring, and adding the OQAM real/imaginary signals, and generating and outputting at least two times the frequency of the symbol clock corrected from the detected timing error information, wherein the symbol clock recovery comprises: an OQAM converter for converting each of the VSB digital baseband real/imaginary signals outputted from the carrier recovery into OQAM real/imaginary component signals; a high pass filter performing a high-passband-filtering to the OQAM real/imaginary component signals outputted section; from the OQAM converter for removing information of data section; **a squarer for**	signals; a high pass filter performing a high pass-band filtering on the OQAM real/imaginary component signals outputted from the OQAM converter for removing information of data section; **a first squaring operator squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high pass filter, and calculating difference of the two squared signals and squaring the calculation; a second squaring operator squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high pass filter, and calculating and squaring a difference of the two squared signals; an adder adding the output of the first and second squaring operators;** a pre-filter passing only a frequency of a predetermined band for recovering the symbol clock from the	

	squaring each of the OQAM real/imaginary component signals filtered by and outputted from the high passband filter, and adding and outputting the calculation; a pre-filter for passing only a frequency of a particular band to recover the symbol clock from the output of the **squarer**; a timing error detector for detecting timing error information from the output of the pre-filter; a filtering member for filtering only the low passband signal from the timing error information outputted from the timing error detector; and an NCO for generating at least two times the frequency of the symbol clock recovered according to low passband signals of the filtered timing error information and outputting to the first resampler.	output of the **adder**; a timing error detector detecting timing error information from the output of the pre-filter; a filtering member filtering only the low pass-band signal from the timing error information outputted from the timing error detector; and an NCO for generating at least two times the frequency of the symbol clock recovered according to low pass-band signals of the filtered timing error information and outputting to the first resampler. **Where the squarer in the current application is the first and second squaring operators and the adder in the '041 application. The output of the squarer is the output of the adder because the adder is the last step in the squaring operator. No change in function or parts.**	
15	The digital TV receiver of claim 14, wherein the OQAM converter multiplies	The digital TV receiver of claim 16, wherein the OQAM converter multiplies	**19**

	the VSB digital baseband real/imaginary component signals outputted from the carrier recovery by the fixed frequency with a center frequency of 2.690559 MHz for converting the VSB digital baseband real/imaginary component signals into the OQAM real/imaginary component signals.	digital base-band real/imaginary component signals interpolated and outputted from the resampler by a fixed frequency with a center frequency of 2.690559 MHz for converting digital base-band real/imaginary component signals into the OQAM real/imaginary component signals. **No change in function or parts.**	

Conclusion

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent No. 5,872,815 to Strolle et al. discloses an apparatus for generating timing signals for a digital television signal receiver.

b. U.S. Patent No. 6,160,443 to Maalej et al. discloses a dual automatic gain control in a QAM demodulator.

c. U.S. Patent No. 6,862,325 to Gay-Bellile et al. discloses a multi-standard channel decoder.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krista M. Flanagan whose telephone number is (571) 272-2203. The examiner can normally be reached on Monday - Friday, 8 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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